EXPERIMENTAL LINE LIST OF WATER VAPOR ABSORPTION LINES IN THE SPECTRAL RANGES 1850 – 2280 CM^{-1} AND 2390 – 4000 CM^{-1}

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A new experimental line parameter list of water vapor absorption lines in the spectral ranges 1850 – 2280 cm^{-1} and 2390 – 4000 cm^{-1} is presented. The line list is based on the analysis of several transmittance spectra measured using a Bruker IFS 125 HR high resolution Fourier transform spectrometer. A total of 54 measurements of pure water and water/air-mixtures at 296 K as well as water/air-mixtures at high and low temperatures were performed. A multispectrum fitting approach was used applying a quadratic speed-dependent hard collision line shape model in the Hartmann-Tran implementation[ab] extended to account for line mixing in the Rosenkranz approximation in order to retrieve line positions, intensities, self- and air-broadening parameters, their speed-dependence, self- and air-shifts as well as line mixing and in some cases collisional narrowing parameters. Additionally, temperature dependence parameters for widths, shifts and in a few cases line mixing were retrieved. For every parameter an extensive error estimation calculation was performed identifying and specifying systematic error sources. The resulting parameters are compared to the databases HITRAN12[c] and GEISA15[d] as well as experimental values. For intensities, a detailed comparison to results of recent ab initio calculations performed at University College London was done showing an agreement within 2 % for a majority of the data. However, for some bands there are systematic deviations attributed to ab initio calculation errors.

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[a] N.H. Ngo *et al*. JQSRT **129**, 89-100 (2013) doi:10.1016/j.jqsrt.2013.05.034; JQSRT **134**, 105 (2014) doi:10.1016/j.jqsrt.2013.10.016.

[b] H. Tran *et al*. JQSRT **129**, 199-203 (2013) doi:10.1016/j.jqsrt.2013.06.015; JQSRT **134**, 104 (2014) doi:10.1016/j.jqsrt.2013.10.015.

[c] L.S. Rothman *et al*. JQSRT **130**, 4–50 (2013) doi:10.1016/j.jqsrt.2013.07.002.

[d] N. Jacquinet-Husson *et al*. JMS **112**, 2395–2445 (2016) doi:10.1016/j.jms.2016.06.007.